

NASA SBIR/STTR Technologies

H4.01-9736 - Multipurpose Cooling Garment for Improved Space Suit Environmental Control



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Identification and Significance of Innovation

Goal: Improved thermal comfort as part of a nonventing spacesuit thermal control system

Approach: Absorb water vapor from inside pressure garment, reject heat from LiCl absorber/radiator (LCAR)

Context: Future manned space exploration missions

- Long duration mission with frequent EVAs
- Existing technology leads to condensation of perspiration in LCVG when metabolic loads are high: uncomfortable and unhygienic
- Minimizing water venting is a key requirement. Create's LCAR and SEAR technologies have already demonstrated this capability

Innovation: A modified LCVG that absorbs water vapor directly from inside the pressure garment and ports it to the LCAR

Estimated TRL at beginning and end of contract: (Begin: 3 End: 4)

Technical Objectives and Work Plan

Technical Objectives

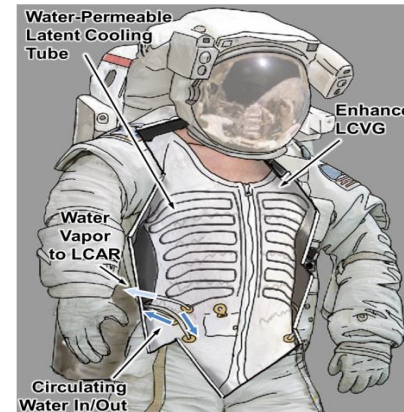
High permeation rates for water vapor
-Designed for highest expected metabolic loads

Minimal impact on LCVG
-No reduction in mobility or comfort

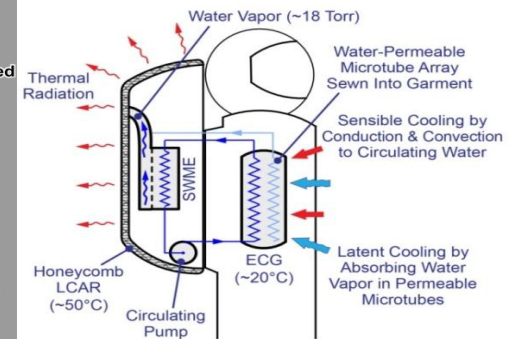
Rugged, durable, compact, and lightweight
-Suitable for many EVA sorties in a remote environment

Work Plan

Identify operating and performance requirements
Demonstrate operation of a proof-of-concept garment
Design a prototype LCVG with water vapor absorption



Simple Modifications to an LCVG.
The ECG Improves Astronaut
Thermal Comfort by Absorbing
Perspired Water Vapor



The ECG Operates as Part of a
Nonventing Space Evaporator
Absorber Radiator (SEAR) System for
Space Suit Thermal Control

NASA Applications

NASA application: future manned space exploration

Thermal control systems for exploration space suits
-Modified system can also be used for heat-driven water vapor management for spacecraft and manned rovers

Non-NASA Applications

Terrestrial applications: Heat driven dehumidifiers
-Vehicular and container-based applications
-Microclimate cooling systems

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NON-PROPRIETARY DATA